4. $\frac{d}{dx}\, x e^{\ln x^2} = \frac{d}{dx}\, x \cdot x^2 = \frac{d}{dx} x^3 = 3x^2$

6. $y = \sqrt{16-x}$ $(0,4)$ normal $\perp$

$y' = \frac{1}{2}(16-x)^{-\frac{1}{2}}(-1)\Big|_{x=0} = \frac{-1}{2\sqrt{16}} = -\frac{1}{8}$

$m_\perp = 8$

Mar 29-7:30 AM

1. $\int_0^1 \sqrt{x}(x+1)\,dx = \int x^{3/2} + x^{\frac{1}{2}}\,dx$

$= \frac{2}{5}x^{5/2} + \frac{2}{3}x^{3/2}\Big|_0^1$

7. $(3,5)$ need slope $= 2 = f'(3)$

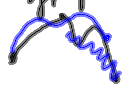
$y = 2(x-3)+5$

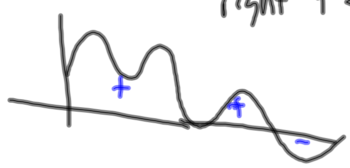
read from graph

9 min f': ~~0+~~

endpts left $f' > 0$

right $f' < 0$





$f(x) = \int_0^x f'(t)\,dt$

Mar 29-9:17 AM

10. $y = xy + x^2 + 1$ $x=-1$ $\frac{dy}{dx} =$

$\frac{dy}{dx} = x\frac{dy}{dx} + y\cdot 1 + 2x$

$y = -y + 2$

$2y = 2$

$y = 1$

$\frac{dy}{dx} - x\frac{dy}{dx} = 2x + y$

$\frac{dy}{dx}\cancel{(1-x)} = \frac{2x+y}{1-x} = \frac{-2+1}{1--1} = \frac{-1}{2}$

Mar 29-7:51 AM

11 $\int_1^\infty \frac{x}{(1+x^2)^2}\,dx = \lim_{b\to\infty}\int_1^b \frac{x}{(1+x^2)^2}\,dx$

$u = 1+x^2$

$du = 2x\,dx$

$\frac{du}{2x} = dx$

$\int \frac{x}{u^2}\frac{dx}{2x} = \frac{1}{2}\int \frac{1}{u^2}\,du$

$= -\frac{1}{2}\frac{1}{u} = -\frac{1}{2(1+x^2)}$

$\frac{1}{u^2} = u^{-2}$

$\lim_{b\to\infty}\left(\frac{-1}{2(1+b^2)} - \frac{-1}{2(1+1^2)}\right) = \frac{1}{4}$

Mar 29-7:57 AM

(net area)

Review 17 Riemann Sums, Accumulation Functions

LRAM, RRAM, MRAM

$$\sum_{i=1}^{n} f(x_i)\Delta x$$

$$\lim_{\substack{n\to\infty \\ \Delta x\to 0}} \sum_{i=1}^{n} f(x_i)\Delta x = \int_a^b f(x)\,dx$$

LRAM - leave off last $f(x)$

RRAM - leave off first $f(x)$

MRAM - use middle values (every other one)

$(\text{sum } f(x)\text{'s}) \cdot \Delta x$

Mar 29-8:05 AM

new book p175

p174 #2

LRAM A) $[0+6+10+16 \ldots + 12+4] \cdot 1$

114 in

LRAM $\approx \int_0^{10} v(t)\,dt$

RRAM $\approx$

RRAM B) $[6+10+16+\ldots+4+2]$

116 in

MRAM $\Delta x = 2$: $[6+16+12+22+4] \cdot 2$

120 in

Mar 29-8:15 AM

Definite Integral of a rate of change

$$\int_a^b f'(x)\,dx = f(b) - f(a)$$

net change

$$f(a) + \int_a^b f'(x)\,dx = f(b)$$

initial displacement final

accumulation function $\int_a^x f'(t)\,dt = f(x) - f(a)$

Mar 29-8:21 AM

p177 #2 apples Quick poll

$$\int_0^{14} 1.3 + 1.025^t \,dt = 34.92 \text{ kbu}$$

Mar 29-8:25 AM